REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

The Applicants acknowledge with appreciation the indication in the Final Rejection that claims 2-28 are allowable. Allowable claims 7 and 13 have each been amended to include a period at the end of the sentence.

The Applicants wish to thank the examiner, Meless Zewdu, for the courtesy extended to one of the Applicants' representatives, David Ward, Reg. No. 45198, during a telephone interview conducted on March 18, 2009. A summary of the issues discussed during the interview is included in the comments below.

Claims 1 and 31 have been amended. Support for the amendments is provided in the original claims and paragraph [0043] of the published specification. (It should be noted that references herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to the referenced embodiments.)

Claims 1 and 31-35 were rejected, under 35 USC §103(a), as being unpatentable over Sampath et al. (US 6,922,445) in view of Miyata et al. (US 2004/0022205) and Li et al. (US 6,947,748). To the extent these rejections may be deemed applicable to the amended claims, Applicants respectfully traverse as follows.

Claim 1 now defines a radio communication apparatus that sets for a divided band, having a plurality of subcarriers, a transmission format including a spatial multiplexing number based on a detected adaptability of the divided band for spatial multiplexing.

The Final Rejection proposes that Sampath discloses setting a transmission format for a divided band (see Final Rejection page 3, lines 4-5), but acknowledges that Sampath does not

disclose the claimed subject matter of setting such a format on the basis of the divided band's adaptability to spatial multiplexing (see page 3, lines 6-7). Because Sampath does not disclose detecting a divided band's adaptability to spatial multiplexing, it necessarily follows that Sampath cannot disclose the Applicant's claimed subject matter of setting a spatial multiplexing number of the transmission format based on a detected adaptability of the divided band for spatial multiplexing.

The Final Rejection does not cite Miyata or Li for supplementing the teachings of Sampath with respect to setting a transmission format for a divided band. Instead, the Final Rejection cites Miyata for disclosing the determination of a TDMA/TDD slot's adaptability to spatial multiplexing and cites Li for disclosing a divided band having a plurality of subcarriers (see page 3, lines 7-21).

Accordingly, the Applicant submits that the teachings of Sampath, Miyata and Li, considered individually or in combination, do not render obvious the subject matter defined by claim 1. More specifically, the applied references do not disclose the claimed subject matter of setting for a divided band, having a plurality of subcarriers, a transmission format including a spatial multiplexing number based on a detected adaptability of the divided band for spatial multiplexing. Independent claims 31, 32, and 34 similarly recite the above-mentioned subject matter distinguishing apparatus claim 1 from the applied references, but claims 31 and 34 do so with respect to methods. Therefore, allowance of claims 1, 31, 32, and 34 and all claims dependent therefrom is warranted.

To promote a better understanding of the patentable distinctions of the claimed subject matter over the applied references, the Applicant submits the following additional remarks.

Sampath discloses that a base station divides data into K streams, subjected to processing such as modulation, and outputs the K streams to M transmission antennas. One antenna is deactivated and, consequently, spatial-multiplexing transmission is performed for K streams using (M-1) transmission antennas (see Sampath col. 6, lines 35-44, and col. 7, lines 6-19).

Further, by feedback information from a terminal, it is possible to determine the number of streams data is divided into (the number of spatial multiplexing K) and determine the transmission format including the modulation scheme and coding rate for each stream (see col. 8, lines 11-25).

For antenna selection, an average value of a quality parameter QP over subcarrier tones in each antenna is compared to a threshold and an antenna having a lower average QP than the threshold is deactivated. Comparison results between QP' s and the threshold and information indicating which antenna is deactivated are fed back from the terminal to the base station.

Further, each antenna uses a common band (i.e., whole communication band).

Therefore, although Sampath discloses determining the number of spatial multiplexing in the whole communication band, setting a transmission format per stream (in a setting section), and transmitting each stream from a plurality of transmission antennas using the whole communication band, Sampath does not disclose detecting adaptability to spatial multiplexing transmission for each divided band and setting, for each divided band, a transmission format including the number of spatial transmission, as now recited in claims 1 and 31.

Miyata discloses detecting various parameters to judge the suitability for space-division multiplexing for each time slot and determining which channel is allocated to a mobile terminal (see Miyata paragraph [0047]). Therefore, Miyata merely discloses detecting the suitability for space division multiplexing for each time slot in a whole communication band.

Li relates to the allocation of subcarriers in OFDMA and discloses that a terminal measures received quality (such as SINR and power) of each cluster (including a plurality of subcarriers) in pilot periods for received signals from a base station, selects candidate clusters based on the measurement, and feeds back the ID's of the selected clusters. A base station determines clusters to allocate to the terminal based on this feedback information (see Li col. 9, lines 40-64, and Fig. 4).

However, Li does not disclose detecting adaptability to spatial multiplexing transmission for each divided band and setting, for each divided band, a transmission format including the number of spatial transmission.

In summary, Sampath does not disclose detecting adaptability to spatial multiplexing transmission for each divided band and setting, for each divided band, a transmission format including the number of spatial transmission, as recited in claims 1 and 31. Miyata merely discloses detecting the suitability for space-division multiplexing for each time slot in a whole communication band. Li discloses clusters including a plurality of subcarriers; Li does not disclose the above-described subject matter of the independent claims.

The claimed invention supports setting the level of spatial multiplexing per divided band, utilizing a high correlation of channel response between subcarriers which are present in relatively close positions. By employing this configuration, compared to a case where the level of spatial multiplexing is set per subcarrier, it is possible to provide a unique advantage of the claimed invention of reducing the amount of calculations significantly without degrading accuracy. Further, by detecting the adaptability to spatial multiplexing transmission in units of divided bands, it is possible to provide an advantage of preventing erroneous settings of a transmission format even when frequency selective fading occurs and the level of part of

subcarriers decreases. These advantages are disclosed in paragraphs [0043] and [0044] of the instant specification.

Further, by adaptively setting the characteristics of channels, it is possible to achieve high frequency use efficiency, compared to a case where one spatial multiplexing level is set in the whole communication band, as shown in Sampath and Miyata.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

Respectfully submitted,

/James Edward Ledbetter/

Date: April 6, 2009
JEL/DWW/att

James E. Ledbetter
Registration No. 28,732

Attorney Docket No. 009289-06109
Dickinson Wright PLLC
1875 Eye Street, NW, Suite 1200
Washington, DC 20006
Telephone: (202) 659-6966
Facsimile: (202) 659-1559